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Efficacy evaluation of foliar fungicide application timing in field corn in central Nebraska, 2011.

A foliar fungicide efficacy timing trial was conducted at the University of Nebraska-Lincoln South Central Agricultural Laboratory near Clay Center, NE. Dekalb corn hybrid DKC 62-54, rating of "good" (6 out of 9) for gray leaf spot (GLS) and "excellent" (2 out of 9) for common rust (CR), was planted on 3 May in 30 in. rows with a target population of 32,000 plants/A. The trial area was disked with a crop history of seven years of continuous corn. On 9 May before plant emergence, a herbicide program of Roundup (1 pt/A), Verdict (16 fl oz/A) and Atrazine (1 lb/A) was applied to the trial site. Eight treatments and a non-treated control were replicated six times in a randomized complete block design. Each plot was four rows (10 ft) wide by 40 ft in length. Foliar fungicides were applied with a modified high-clearance sprayer. The 10 ft spray boom consisted of six nozzles (TeeJet XR11002) spaced 20 in. apart and 18 in. above the canopy. Each treatment was applied at 40 psi traveling 3.0 mph resulting in a 20 gal/A application volume. Foliar fungicides were applied on 13 Jun (V6) and 15 Jul (R1). GLS and CR disease severity was assessed by estimating percent leaf area covered with lesions over the entire plot on 13 Jun (V6), 11 Jul (V16), 13 Jul (V17/V18), 11 Aug (R4), and 25 Aug (R5, milk line 1/3 down from the kernel top). These data were used to calculate area under the disease progress curve (AUDPC). Corn lodging was assessed on 7 Oct as the percentage of corn stalks lodged below the ear from 50 stalks pushed from the standing 12 o'clock position to the 2 o'clock position (45° angle). Stay green percentage was assessed on 19 Sep as the percentage of green leaf material remaining on the plant averaged through the plot. All data assessments were taken from the two center rows of each plot, except push lodging was done in the two outside rows. Grain was mechanically harvested with a two-row research combine on 19 Oct. The ends of plots were trimmed prior to harvest and the harvested area of each plot was measured following harvest and used to calculate yield. Data were subjected to analysis of variance and means were compared at the 0.05 significance level using Waller-Duncan k-ratio t test. Monthly rainfall and temperature readings recorded at South Central Agricultural Lab were relatively normal during the growing season although temperatures did get very warm during the VT and R1 growth stages. However, scouting observations of corn ears did not indicate that temperatures appeared to affect kernel and ear development. Supplemental water was added as needed by an overhead sprinkler linear irrigation system.

GLS was the predominant foliar disease present in this trial. Percent severity remained low and fairly level through the growing season with percent severity not exceeding 2.4% for any treatment on any assessment date. GLS lesions were identified on the ear leaf by early Aug. CR exhibited low severity levels near the R1 application (0.1%) and remained low the entire season with disease severity not exceeding 0.5% for any treatment on any assessment date. The area under the disease progress curve calculations indicated all fungicide treatments at all application timings reduced GLS and CR severity as compared to the non-treated control. There were no statistical differences in push lodging as percentages ranged from 3.3% to 10.0%. There were statistical differences between treatments for stay green %. The non-treated control had the lowest level of stay green as percentages ranged from 22.4% to 30.7%. There were significant differences among treatments for 500-count kernel weights as weights ranged from 6.11 oz to 6.39 oz. There were no statistical differences in grain moisture at harvest as percentages ranged from 14.9% to 15.3%. There were no statistical differences between treatments for dry yield. Priaxor, 4 fl oz/A at V6 was the lowest yielding treatment at 231.5 bu/A. Priaxor, 2 fl oz/A at V6 followed by Headline AMP, 10 fl oz/A at R1 was the highest yielding treatment with 244.0 bu/A.

Treatment, Rate/A, Timing	GLS AUDPC ^z	CR AUDPC	Lodging (%) ^y	Stay Green (%) ^x	500 Kernel Weight (oz)	Grain Moisture (%)	Dry Yield (bu/A) ^w
Non-Treated Control.....	63.5 a ^y	11.4 a	8.3	22.4 e	6.27 ab	15.1 abc	238.7
Headline 2.09 SC ^u , 3 fl oz, V6.....	44.2 b	10.2 ab	10.0	25.4 de	6.24 ab	14.9 c	235.3
Headline 2.09 SC ^u , 6 fl oz, V6.....	39.7 bc	7.1 b	6.0	26.8 bcd	6.39 a	15.0 abc	240.5
Priaxor 4.17 SC ^u , 2 fl oz, V6.....	36.4 bc	9.3 ab	7.3	25.9 cde	6.11 b	15.0 abc	231.5
Priaxor 4.17 SC ^u , 4 fl oz, V6.....	26.9 cd	7.9 ab	9.7	24.6 de	6.23 ab	15.0 bc	235.0
Headline 2.09 SC ^u , 3 fl oz, V6 fb							
Headline AMP 1.67 SC ^t , 10 fl oz, R1.....	15.3 de	6.6 b	8.7	29.4 abc	6.27 ab	15.1 abc	232.2
Priaxor 4.17 SC ^u , 2 fl oz, V6 fb							
Headline AMP 1.67 SC ^t , 10 fl oz, R1....	8.8 e	7.2 b	8.0	30.3 ab	6.37 a	15.1 abc	244.0
Headline AMP 1.67 SC ^u , 5 fl oz, V6 fb							
Headline AMP 1.67 SC ^t , 10 fl oz, R1.....	12.6 e	7.7 ab	3.3	30.7 a	6.17 ab	15.3 a	238.1
Headline AMP 1.67 SC ^t , 10 fl oz, R1....	11.4 e	9.5 ab	3.3	30.7 a	6.22 ab	15.2 ab	242.5
Coefficient of Variation (%)	44.7	31.9	65.2	12.0	2.5	1.2	6.7

^zArea under the disease progress curve.

^yLodging was estimated as the percentage of corn stalks lodged below the ear from 50 stalks pushed to arm's length.

^xStay green was estimated as the percentage of green leaves remaining on the plant.

^wYield calculations adjusted to a moisture content of 15.5%.

^vData followed by the same letter or without letters within a column are not statistically different ($P > 0.05$) according to the Waller-Duncan k-ratio t test.

^uTreatment included Roundup PowerMax, 22 fl oz/A

^tTreatment included non-ionic surfactant (NIS), 0.25% V/V